Patent Abstracts

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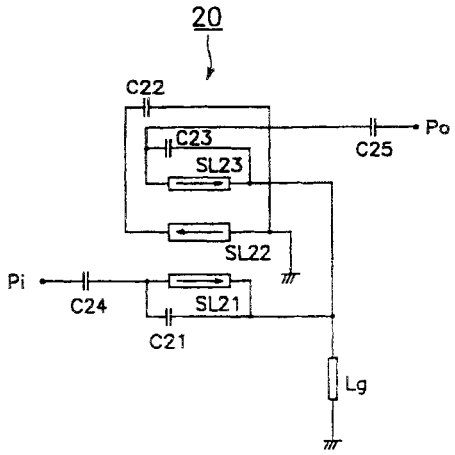
6,429,753 Aug. 6, 2002

HIGH-FREQUENCY FILTER, COMPLEX ELECTRONIC COMPONENT USING THE SAME, AND PORTABLE RADIO APPARATUS USING THE SAME

Inventors: Teruhisa Tsuru, Tomoya Bando, Ken Tonegawa, Harufumi Mandal, and Norihiro Shimada.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Jan. 20, 2000.

***Abstract*—**A high-frequency filter **10** serving as a bandpass filter has three transmission lines SL**11** to SL**13** side-coupled in three stages. The transmission lines SL**11** to SL**13** are respectively connected in parallel to capacitors C**11** to C**13**. One end of the input transmission line SL**11** is connected to an input terminal Pi through an input capacitor C**14**. One end of the output transmission line SL**13** is connected to an output terminal Po through an output capacitor C**15**. The other ends of the transmission lines SL**11** and SL**13** are connected and the connection point is connected to the ground through an inductor Lg for forming a pole. One end of the transmission line SL**12** is connected to the ground.

24 Claims, 7 Drawing Sheets



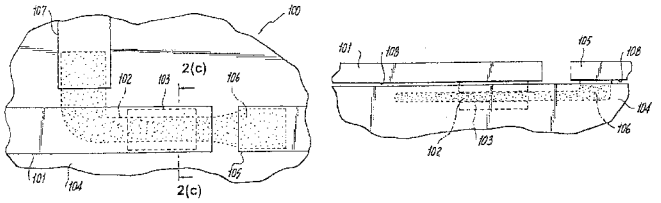
6,429,755 Aug. 6, 2002

METHOD FOR CONSTRUCTING AN ENCAPSULATED MEMS BAND-PASS FILTER FOR INTEGRATED CIRCUITS

Inventors: James L. Speidell and James F. Ziegler.
Assignee: International Business Machines Corporation
Filed: Jan. 30, 2001.

***Abstract*—**Integrated circuit fabrication technique for constructing novel MEMS devices, specifically band-pass filter resonators, in a manner compatible with current integrated circuit processing, and completely encapsulated to optimize performance and eliminate environmental corrosion. The final devices may be constructed of single-crystal silicon, eliminating the mechanical problems associated with using polycrystalline or amorphous materials. However, other materials may be used for the resonator. The final MEMS device lies below the substrate surface, enabling further processing of the integrated circuit, without protruding structures. The MEMS device is about the size of a SRAM cell, and may be easily incorporated into existing integrated circuit chips. The natural frequency of the device may be altered with post-processing or electronically controlled using voltages and currents compatible with integrated circuits.

15 Claims, 8 Drawing Sheets



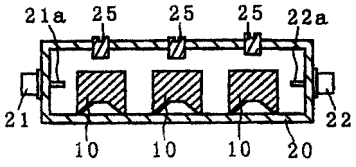
6,429,756 Aug. 6, 2002

DIELECTRIC RESONATOR, FILTER, DUPLEXER, OSCILLATOR AND COMMUNICATION APPARATUS

Inventors: Toru Kurisu, Hirotsugu Abe, and Yukio Higuchi.
Assignee: Murata Manufacturing Co., Ltd.
Filed: May 24, 2000.

***Abstract*—**A dielectric resonator comprising a resonator section and a supporting base section which are made of the same dielectric material as a single unit. The resonator section and the supporting base section have substantially the same outside diameter. A concave section having a trapezoidal cross-sectional shape is provided within the supporting base section such that the inside diameter of the supporting base section becomes smaller in the direction from the end face, which is used as a mounting face, and toward the resonator section.

24 Claims, 4 Drawing Sheets



6,429,757 Aug. 6, 2002

COUPLING ARRANGEMENT FOR A STRIPLINE NETWORK

Inventors: Ingmar Karlsson, Camilla Johansson, and Yvonne Jensen.
Assignee: Telefonaktiebolaget LM Ericsson
Filed: Dec. 22, 1999.

***Abstract*—**Coupling arrangement **(100, 200)** for a stripline network, which comprises a first **(160)** and a second **(110)** ground place, which ground planes are arranged essentially parallel to one another, extend in a common main direction, and each have at least one aperture **(170, 120),** a stripline conductor

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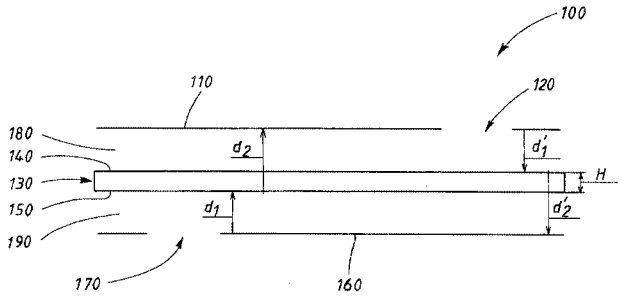
(130) arranged between the first **(160)** and the second **(110)** ground plane, a first dielectric layer **(190)** located between the stripline conductor **(130)** and the first ground plane **(160),** and a second dielectric layer **(180)** located between the stripline conductor **(130)** and the second ground plane **(110)**. The stripline conductor has a first main surface **(150)** facing toward the first ground plane and a second main surface **(140)** facing toward the second ground plane. In connection with the apertures **(170, 120)** of the ground planes, the distance (d_1, $d_{1'}$) from the aperture to the most closely located main surface **(150, 140)** of the stripline conductor **(130)** is considerably exceeded by the distance (d_2, $d_{2'}$) from said main surface to the other ground plane **(110, 160)**. The distances (d_1, $d_{1'}$) from the apertures **(170, 120)** of each respective ground plane **(160, 110)** to the most closely located main surface **(150, 140)** of the stripline conductor **(130)** are preferably essentially equal.

21 Claims, 2 Drawing Sheets



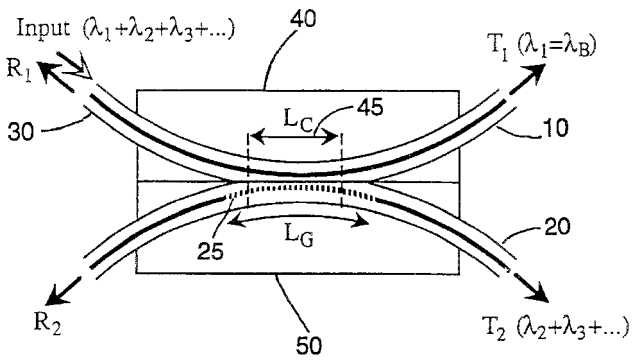
6,430,341 Aug. 6, 2002

WAVEGUIDE COUPLER

Inventors: Philip St. John Russell and Jean-Luc Archambault.
Assignee: Pirelli Cavi e Sistemi S.p.A.
Filed: Oct. 21, 1998.

***Abstract*—**A waveguide coupler comprises at least a first waveguide coupled at a coupling region to a second waveguide such that at least a part of radiation propagating along the first waveguide is coupled into the second waveguide. The second waveguide comprises a diffraction grating disposed at the coupling region to inhibit coupling of radiation from the first waveguide into the second waveguide at wavelengths characteristic of the diffraction grating.

13 Claims, 3 Drawing Sheets



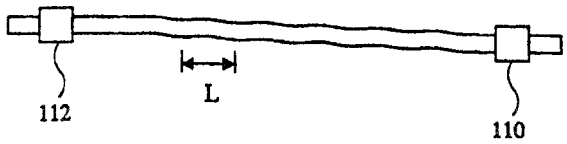
6,430,342 Aug. 6, 2002

FIBER GRATING AND FIBER OPTIC DEVICES USING THE SAME

Inventors: Byoung Yoon Kim and In Kag Hwang.
Assignee: Korea Advanced Institute of Science and Technology; Donam Systems Inc.
Filed: May 8, 1999.

***Abstract*—**The present invention relates to a fiber grating which introduces a plurality of asymmetric microbends in a fiber. The present invention also relates to fiber optic devices, such as a fiber-optic filter, a fiber-optic polarizer, a fiber-optic wavelength tunable bandpass filter, a fiber-optic frequency shifter, using the above fiber grating which has asymmetric mode-coupling characteristics. The optical devices of the present invention exhibit a high mechanical durability and a long-term stability of the device, degradation of the optical fiber device due to a change in the characteristics of the grating can be prevented even after a long time at high temperature. In particular, the fiber grating according to the present invention has asymmetric mode coupling characteristics, so that it can be prevalently applied to an optical fiber notch filter, an optical fiber polarizer, an optical fiber wavelength tunable bandpass filter, an optical fiber frequency shifter and so on.

14 Claims, 5 Drawing Sheets



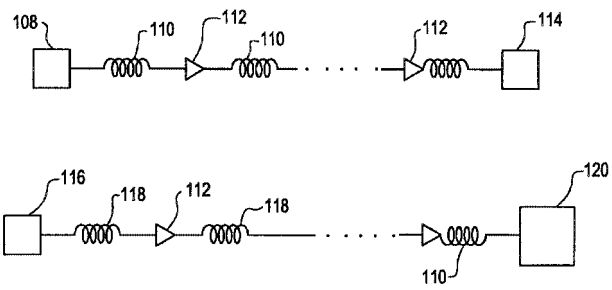
6,430,346 *Aug. 6, 2002

NEGATIVE DISPERSION SINGLE MODE WAVEGUIDE FIBER

Inventors: Jan Conradi, Shiva Kumar, and Steven S. Rosenblum.
Assignee: Corning Incorporated
Filed: Jul. 27, 2000.

***Abstract*—**Disclosed is a negative total dispersion waveguide fiber having low attenuation and sufficiently good resistance to bend loss that attenuation is not impacted by cabling or otherwise buffering the waveguide. The total dispersion slope of the waveguide fiber is positive so that the zero dispersion wavelength is greater than 1600 nm. The waveguide fiber may advantageously be used in a link having a distributed feedback laser as a signal source. The negative dispersion of the waveguide in accordance with the invention compresses the launched signal pulse when the laser is positively chirped. The laser is operated at optimum bias, which results in positive chirp, but no dispersion penalty is incurred in the link. The waveguide fiber in accordance with the invention may also be advantageously used as a dispersion compensating fiber in a high performance multiplexed telecommunications link.

39 Claims, 14 Drawing Sheets



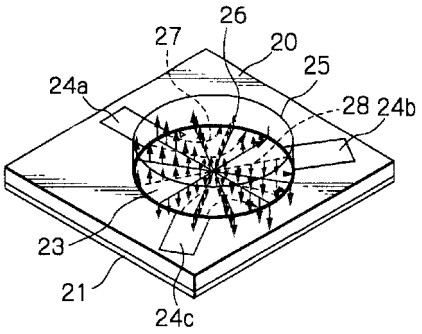
6,433,649 Aug. 13, 2002

NON-RECIPROCAL CIRCUIT ELEMENT AND MILLIMETER-WAVE HYBRID INTEGRATED CIRCUIT BOARD WITH THE NON-RECIPROCAL CIRCUIT ELEMENT

Inventors: Taro Miura, Makoto Hasegawa, Takahide Kurahashi, Hidenori Ohata, Sakae Henmi, and Kazuaki Suzuki.
Assignee: TDK Corporation
Filed: May 14, 2001.

***Abstract*—**A nonreciprocal circuit element includes a microstrip TM_{n10} resonator (n is a positive integer) with a metal disk and branches projecting from the metal disk in a trigonally symmetric structure, and a ferrite magnetic body spontaneously magnetized and coaxially disposed on the microstrip TM_{n10} resonator. The metal disk and the branches are formed on a nonmagnetic dielectric board having a ground conductor on its bottom face. The ferrite magnetic body is arranged so that a position of an electric field node matches to one of the branches.

14 Claims, 7 Drawing Sheets



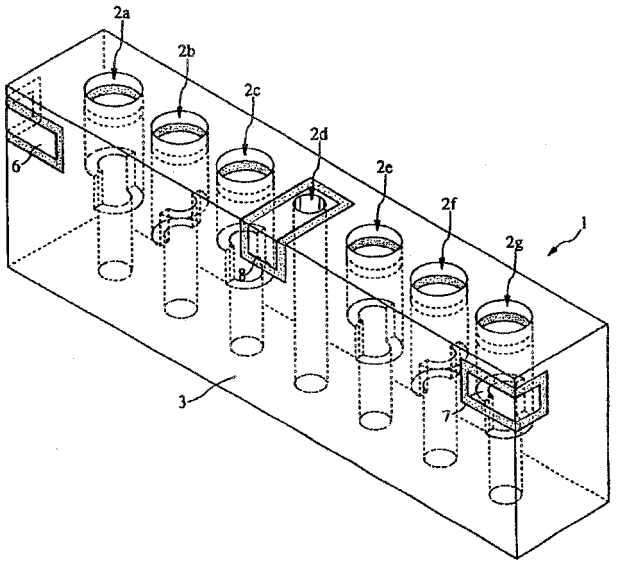
6,433,651 Aug. 13, 2002

DIELECTRIC FILTER, COMPOSITE DIELECTRIC FILTER, DUPLEXER, AND COMMUNICATION APPARATUS HAVING RESONANCE-LINE HOLES WITH OFFSET STEPS

Inventors: Katsuhito Kuroda, Jinsei Ishihara, and Hideyuki Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sep. 13, 1999.

***Abstract*—**There is provided a dielectric filter comprising: a dielectric block; a plurality of resonance-line holes aligned therein; a resonance line disposed on an inner surface of each of the resonance-line holes; and an outer conductor disposed on an outer surface of the dielectric block; wherein one end of the resonance-line hole is a short-circuited end; a sectional area of at least one of the resonance-line holes is changed at a predetermined portion; the predetermined portion of at least one of the resonance-line holes along to the axial direction of the resonance-line hole and at a side opposed to the adjacent resonance-line hole. According to the above structure, the coupling between specified resonance lines among the adjacent resonance lines can be independently determined without changing a pitch for aligning the resonance-line holes.

20 Claims, 7 Drawing Sheets



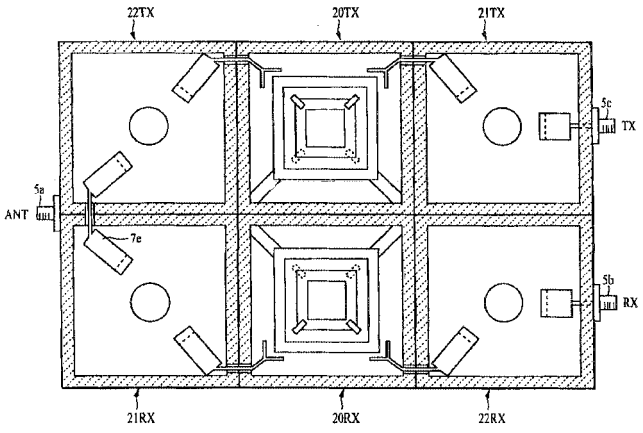
6,433,652 Aug. 13, 2002

MULTIMODE DIELECTRIC RESONATOR APPARATUS, FILTER, DUPLEXER AND COMMUNICATION APPARATUS

Inventors: Jun Hattori, Shin Abe, Hiroki Wakamatsu, and Tomoyuki Ise.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Nov. 22, 2000.

***Abstract*—**A multimode dielectric resonator apparatus is configured such that a TM mode and a TE mode are transformed into multiplex modes, coupling between individual resonant modes can be easily made, and a large number of sequentially coupled stages for a single dielectric core can be obtained. A dielectric core is configured of a plate-like TM-mode dielectric core portion and a TE-mode dielectric core portion protruding therefrom asymmetrically in the upper and lower directions. By this asymmetry of the TE-mode dielectric core portion with respect to the TM-mode dielectric core portion, for example, a TMx mode and a TEz mode may be coupled together, and concurrently, a TMy mode and a TEz mode may be coupled together.

14 Claims, 22 Drawing Sheets



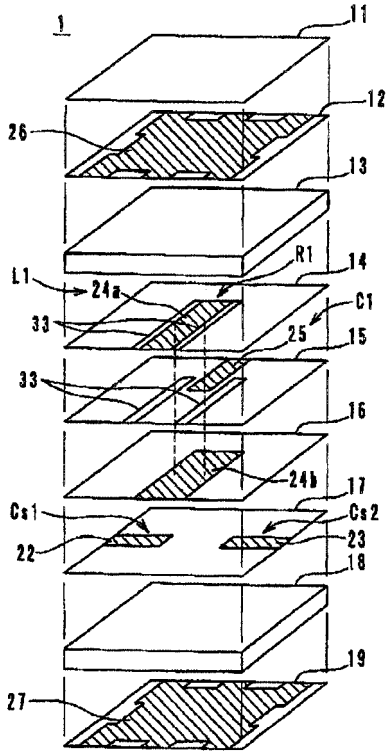
6,433,653 Aug. 13, 2002

MONOLITHIC LC RESONATOR AND FILTER WITH A CAPACITOR ELECTRODE WITHIN A TUBULAR INDUCTOR

Inventors: Sadayuki Matsumura, Noboru Kato, and Hiroko Nomura.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sep. 11, 2000.

***Abstract*—**A monolithic LC resonator includes insulation sheets and inductor patterns that are electrically connected through long via-holes formed in the insulation sheets. The long via-holes are arranged along the right edge and left edge of the inductor patterns, respectively. The inductor patterns and the long via-holes define an inductor having a tubular structure with a substantially rectangular cross-section and filled with an insulator therein. A capacitor pattern is opposed to the open ends of the inductor patterns through the sheets, respectively, to define a capacitor. That is, the capacitor pattern is laminated inside of the tubular structure of the inductor. The capacitor and the inductor having the tubular structure define an LC parallel resonance circuit.

20 Claims, 8 Drawing Sheets



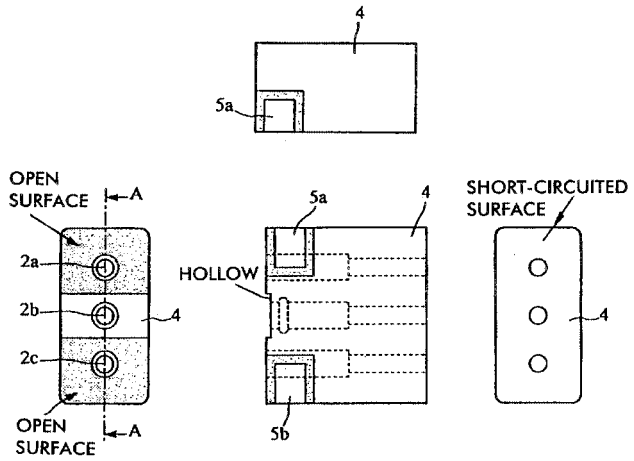
6,433,655 Aug. 13, 2002

DIELECTRIC FILTER, A DIELECTRIC DUPLEXER, AND A COMMUNICATION APPARATUS

Inventors: Motoharu Hiroshima and Hideyuki Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Feb. 16, 2000.

***Abstract*—**A dielectric filter comprising a dielectric block having a substantially rectangular solid shape and having an outer-conductor; a plurality of inner-conductor-coated holes disposed inside the dielectric block; the end portion of at least one inner-conductor-coated hole being an open-circuited surface on which the outer-conductor is not disposed, and an input-output electrode being capacitance-coupled to the vicinity of the end portion of that inner-conductor-coated hole; and both end portions of another inner-conductor-coated hole, which is not capacitance-coupled to an input-output electrode, are covered by the outer-conductor, and an inner-conductorless portion is provided inside the hole. Preferably an end portion of the other hole either is sunken below or protrudes above the open-circuited surface.

9 Claims, 4 Drawing Sheets



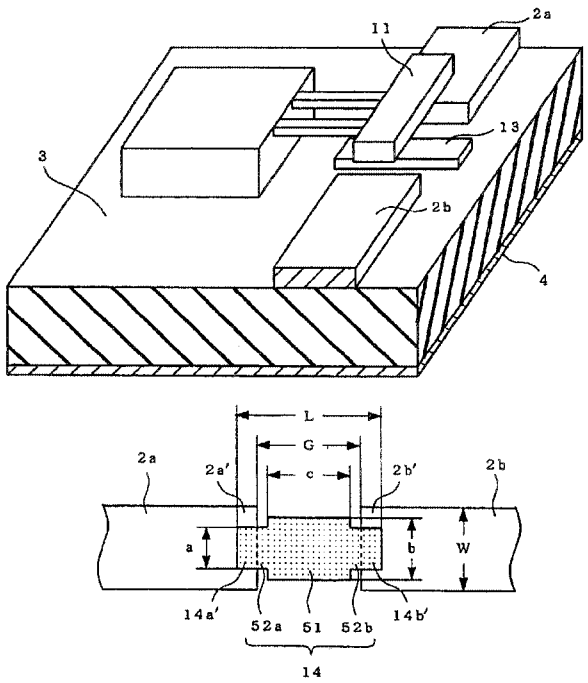
6,433,657 Aug. 13, 2002

MICROMACHINE MEMS SWITCH

Inventor: Shuguang Chen.
Assignee: NEC Corporation
Filed: Nov. 2, 1999.

Abstract*—**A switch includes at least two distributed constant lines (**2a*, **2***b*) disposed close to each other, a movable element (**11**) arranged above the distributed constant lines so as to oppose these distributed constant lines and connecting the distributed constant lines to each other in a high-frequency manner upon contacting the distributed constant lines, and a driving means (**13**) for displacing the movable element by an electrostatic force to bring the movable element into contact with the distributed constant lines. The movable element has a projection (**52***a*, **52***b*) formed by notching at least one end of an edge of the movable element which is located on at least one distributed constant line side. In this projection, a width (a) serving as a length in a direction parallel to the widthwise direction of the distributed constant lines is smaller than a width (W) of each of the distributed constant lines.

20 Claims, 6 Drawing Sheets



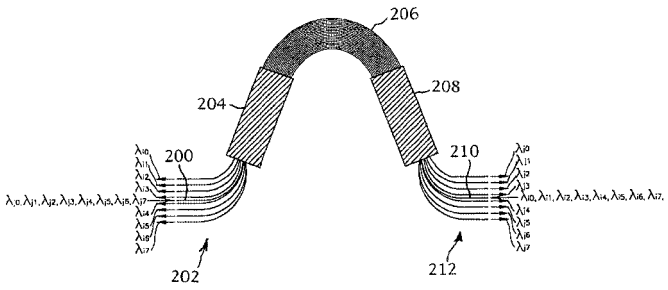
6,434,292 Aug. 13, 2002

BIDIRECTIONAL OPTICAL WAVELENGTH MULTIPLEXER/DIVIDER

Inventors: Hyoun-Soo Kim and Dong-Kyoon Han.
Assignee: Samsung Electronics, Co., Ltd.
Filed: Apr. 22, 1999.

***Abstract*—**A bidirectional optical wavelength multiplexer/demultiplexer capable of simultaneously performing light multiplexing and demultiplexing is provided. This optical wavelength multiplexer/demultiplexer includes an optical waveguide array having a plurality of optical waveguides, a planar waveguide region connected to the optical waveguide array, and an arrayed waveguide grating connected to the planar waveguide region. In this device, the optical waveguide array further includes a central waveguide formed at a location on which light transmitted from the arrayed waveguide grating to the planar waveguide region is focused, on the interface between the optical waveguide array and the planar waveguide region, and light multiplexed with a plurality of wavelengths is received or output via the central waveguide. Accordingly, a central waveguide, through which multiplexed light is received and output, is added at a place where a plurality of optical waveguides and the output spectrum of these waveguides are not affected, so that the wavelength of multiplexed light can be demultiplexed in a direction from an optical waveguide array on one side to an optical waveguide array on the other side, and simultaneously demultiplexed light can be multiplexed in a direction opposite to the above direction.

15 Claims, 5 Drawing Sheets



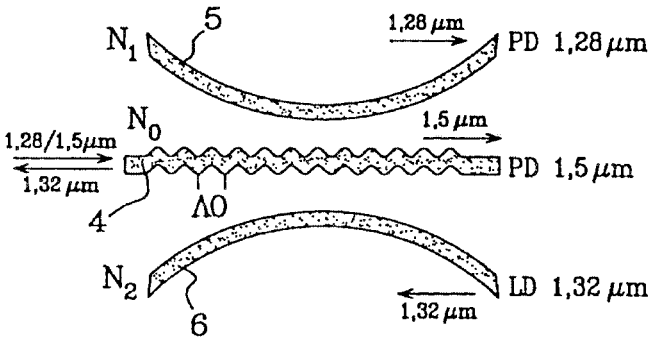
6,434,296 Aug. 13, 2002

OPTICAL MULTIPLEXER/DEMULTIPLEXER WITH THREE WAVEGUIDES

Inventors: Anatolie Lupu and Alain Carenco.
Assignee: Alcatel
Filed: Jun. 1, 2000.

***Abstract*—**The invention relates to an optical multiplexer/demultiplexer able to combine and/or separate at least two optical signals amongst n propagating at different wavelengths, characterized in that it comprises at least one central waveguide (**4**) and two lateral waveguides (**5, 6**), each lateral waveguide (**5** and **6**) constituting with the central guide (**4**) a pair of waveguides, each pair being disposed so as to allow a bidirectional evanescent coupling of an associated wavelength between the guides in each pair (**4, 5**) and (**4, 6**), the coupling being selective with respect to wavelength and assisted by at least one etched grating (Λ), the said waveguides (**4, 5, 6**) being designed so that the multiplexer/demultiplexer has a functioning independent of the state of polarization of the signals. The present invention applies to optical filters and/or direct-access networks for a bidirectional communication in the $1.3 \pm \mu$m window simultaneously with a video distribution at $1.5\ \mu$m.

18 Claims, 6 Drawing Sheets



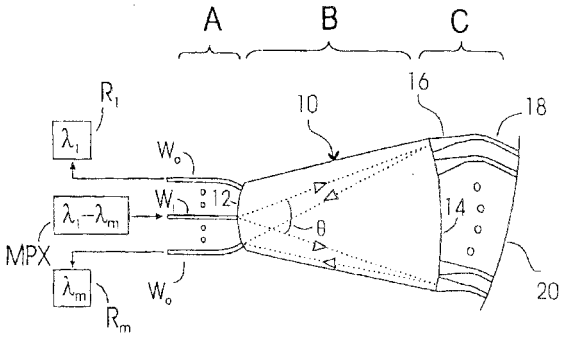
6,434,303 Aug. 13, 2002

OPTICAL WAVEGUIDE SLAB STRUCTURES

Inventors: Henryk Temkin and Rudolf Feodor Kazarinov.
Assignee: Applied WDM Inc.
Filed: Jul. 14, 2000.

***Abstract*—**An optical waveguide device comprising a free space region, suitably provided by a slab waveguide, having optical signal ports for coupling to input and output waveguide sections and an optical waveguide grating including an array of grating waveguides coupling the free space region to a reflector surface to provide a folded structure. Dielectric waveguide structures are preferred. The grating includes tapered optical waveguide sections laterally spaced and optically isolated from each other which extend from the free space region, with the grating waveguides continuing as extensions of the tapered waveguide sections. Each of the grating waveguides differs in length from a neighboring grating waveguide by a constant increment, preferably an optical path length increment. The grating waveguides also include intermediate curved portions having respective curvatures which increase progressively, preferably in an approximately parabolic manner, according to the sequential location of the grating waveguides from a reference grating waveguide in the array.

10 Claims, 4 Drawing Sheets



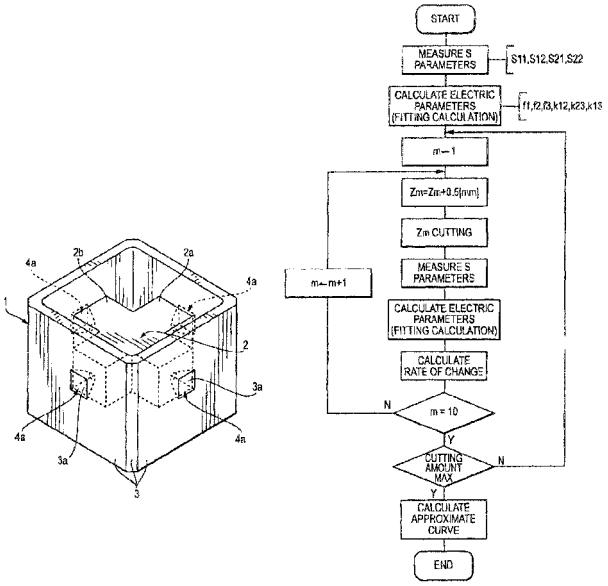
6,437,655 Aug. 20, 2002

METHOD AND APPARATUS FOR AUTOMATICALLY ADJUSTING THE CHARACTERISTICS OF A DIELECTRIC FILTER

Inventors: Masamichi Andoh and Kazuhiko Kubota.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Nov. 9, 1999.

***Abstract*—**A method and an apparatus for exactly and automatically adjusting the characteristics of a dielectric filter in a short time period. The characteristic parameters of a dielectric filter are measured, electric parameters of a designed equivalent circuit of the filter are calculated with the use of characteristic parameters, characteristic adjusting portions of the dielectric filter are adjusted, while at the same time, adjustment functions indicating the variation amounts of electric parameters with respect to adjusting amounts are calculated with the use of the electric parameters and the adjusting amounts which have been changed by the above adjustment. Then, in accordance with simultaneous equations involving adjustment functions, an adjusting amount is calculated with the use of a difference between a present electric parameter and a desired electric parameter, thereby effecting an adjustment which is for example 50%. By repeatedly conducting the above treatments, the characteristic parameters of the filter will be allowed to successively get closer to the desired values.

16 Claims, 12 Drawing Sheets



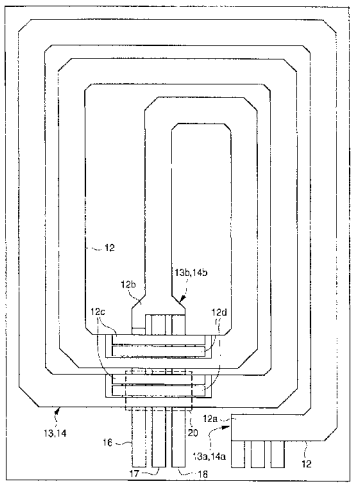
6,437,658 Aug. 20, 2002

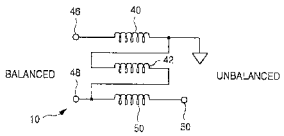
THREE-LEVEL SEMICONDUCTOR BALUN AND METHOD FOR CREATING THE SAME

Inventors: Thomas R. Apel and Richard L. Campbell.
Assignee: TriQuint Semiconductor, Inc.
Filed: May 22, 2001.

***Abstract*—**A three-level semiconductor balun is disclosed. In one embodiment, the balun includes a first spiral-shaped transmission line overlying a substrate. The first transmission line has first and second ends. A second spiral-shaped transmission line is substantially vertically aligned with the first transmission line. The second transmission line has a first end electrically connected to the second end of the first transmission line. A third spiral-shaped transmission line is substantially vertically aligned with the first and second transmission lines. The third transmission line has a first end electrically connected to a second end of the second transmission line. The balun may be integrated on the same chip with other RF circuit components, and is suitable for use at higher frequencies than most conventional baluns.

16 Claims, 7 Drawing Sheets





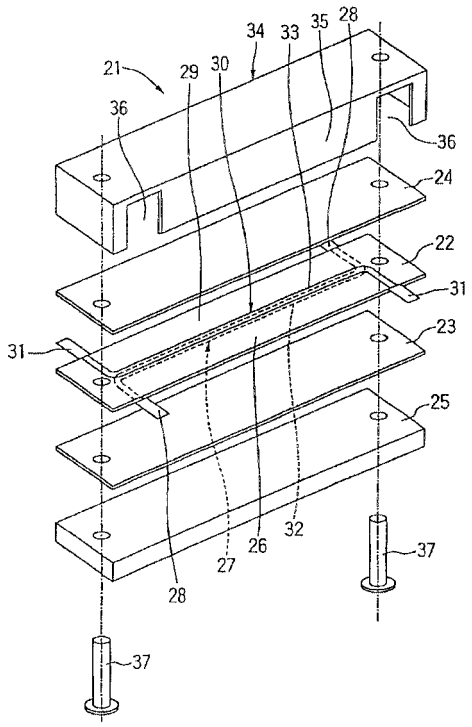
6,437,661 Aug. 20, 2002

DIRECTIONAL COUPLER

Inventors: Hiroaki Nishimura and Yukinori Miyake.
Assignee: Hirose Electric Co., Ltd.
Filed: Mar. 27, 2001.

***Abstract*—**A directional coupler (**21**) comprises main and auxiliary lines (**27, 30**) between dielectric boards (**23, 24**), a ground plate (**25**) provided on the outer face of the dielectric boards (**23**), and a conductive case (**34**) covering the dielectric boards (**23**) and (**24**) and making contact with the ground plate (**25**).

3 Claims, 4 Drawing Sheets



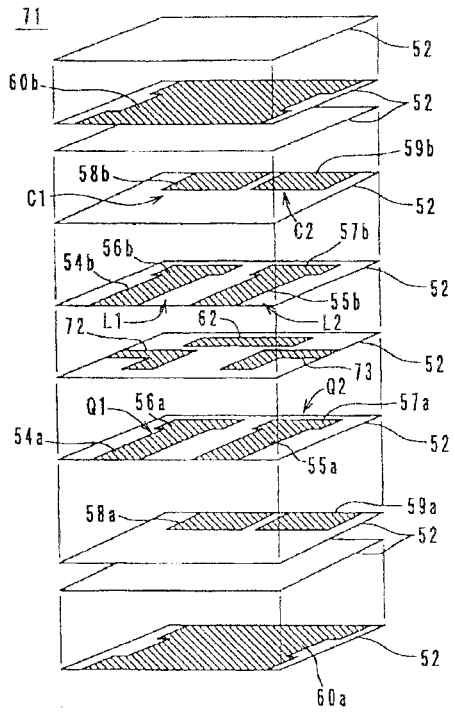
6,437,665 Aug. 20, 2002

LAMINATED LC FILTER WITH COPLANAR INPUT/OUTPUT CAPACITOR PATTERNS AND COUPLING CAPACITOR PATTERNS

Inventor: Noboru Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: May 8, 2000.

***Abstract*—**A laminated LC filter having very large inductance and an excellent Q characteristic, includes insulation layers, inductor patterns having substantially the same shapes and capacitor patterns. The inductor patterns are laminated through the insulation layers, and constitute the inductor of the duplex structure. Similarly, the inductor patterns also constitute the inductor of the duplex structure. The capacitor patterns are opposite to the increased width portions of the inductor patterns, and define the capacitor. Similarly, the capacitor patterns are opposite to the increased width portions of the inductor patterns, and define the capacitor. The coupling capacitor pattern is located between the inductor patterns.

13 Claims, 10 Drawing Sheets



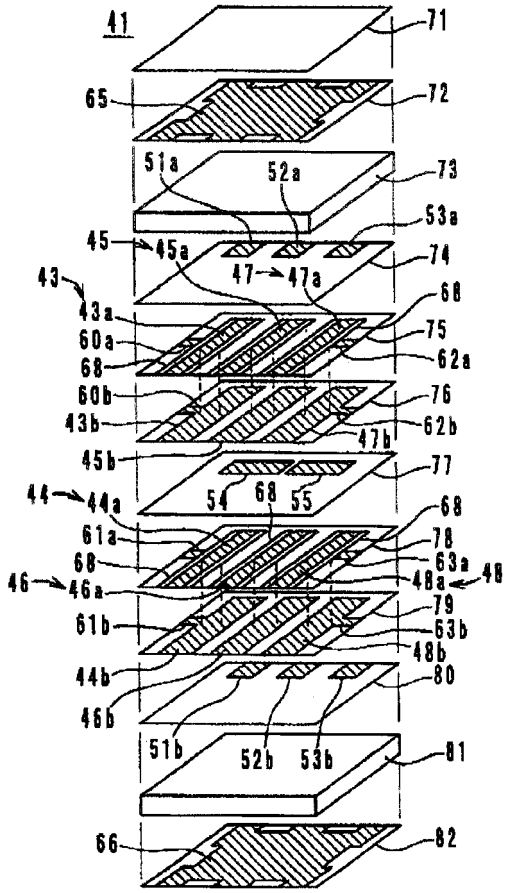
6,437,666 Aug. 20, 2002

MONOLITHIC LC RESONATOR AND MONOLITHIC LC FILTER WITH TUBULAR INDUCTOR

Inventors: Sadayuki Matsumura and Noboru Kato.
Assignee: Murata Manufacturing Co., Ltd.
Filed: Sep. 11, 2000.

***Abstract*—**An LC resonator includes insulation sheets and inductor patterns that are electrically connected through long via-holes provided in insulation sheets, so that tubular structures each having an insulator material disposed therein and having a substantially rectangular cross section are produced. The tubular structures are laminated through sheets to define an inductor having a double structure. A capacitor pattern is opposed to the open ends of the inductor patterns, respectively, to produce a capacitor. That is, the capacitor pattern is arranged between the tubular structures. The capacitor and the inductor having the double structure define an LC parallel resonance circuit.

20 Claims, 10 Drawing Sheets



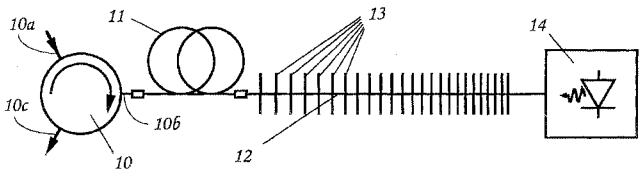
6,438,287 Aug. 20, 2002

DISPERSION COMPENSATION

Inventor: Kevan P. Jones.
Assignee: Nortel Networks Limited
Filed: Jun. 23, 1999.

***Abstract*—**The intrinsic optical loss exhibited by a circulator-based optical fiber chirped Bragg reflection grating optical fiber dispersion compensator is compensated by including a length of amplifying fiber in the path between the circulator and the Bragg grating, this amplifier fiber being optically pumped by pump power launched into the amplifier fiber from the far side of the Bragg grating.

5 Claims, 2 Drawing Sheets



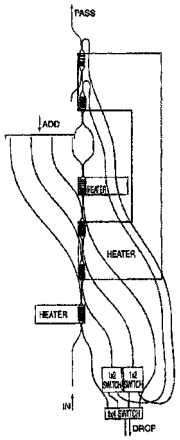
6,438,293 Aug. 20, 2002

TUNABLE OPTICAL ADD/DROP MULTIPLEXER

Inventors: Louay Eldada and Robert A. Norwood.
Assignee: Corning Incorporated
Filed: Oct. 25, 2000.

***Abstract*—**Optical signal devices, wavelength division multiplexer/demultiplexer optical devices, and methods of employing the same in which the core layer includes a grating and is comprised of a material whose refractive index is tuned so that the grating reflects a preselected wavelength of light. A single optical signal device can therefore be used to select a variety of wavelengths for segregation.

17 Claims, 11 Drawing Sheets



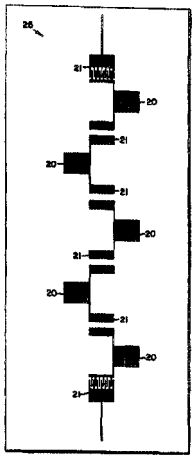
6,438,394 *Aug. 20, 2002

FREQUENCY DEPENDENT INDUCTOR APPARATUS AND METHOD FOR A NARROW-BAND FILTER

Inventors: Dawel Zhang, Guo-Chun Liang, and Chien-Fu Shih.
Filed: Sep. 3, 1996.

***Abstract*—**The present invention provides for a super-narrow band filter using frequency dependent L-C components. The invention utilizes a frequency dependent L-C circuit with a positive slope k for the inductor values as a function of frequency. The positive k value allows the realization of a very narrow-band filter.

22 Claims, 8 Drawing Sheets



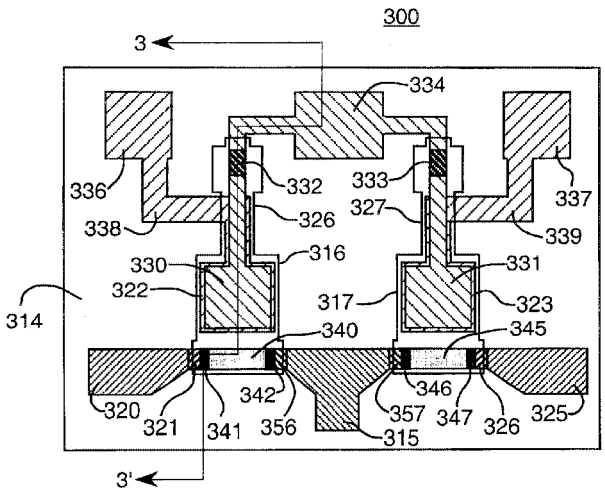
6,440,767 Aug. 27, 2002

MONOLITHIC SINGLE POLE DOUBLE THROW RF MEMS SWITCH

Inventors: Robert Y. Loo, James H. Schaffner, Adele E. Schmitz, Tsung-Yuan Hsu, Franklin A. Dolezal, and Gregory L. Tangonan.
Assignee: HRL Laboratories, LLC
Filed: Jan. 23, 2001.

***Abstract*—**Apparatus for a micro-electro-mechanical switch that provides single pole, double throw switching action. The switch comprises a single RF input line and two RF output lines. The switch additionally comprises two armatures, each mechanically connected to a substrate at one end and having a conducting transmission line at the other end with a suspended biasing electrode located on top of or within a structural layer of the armature. Each conducting transmission line has conducting dimples that protrude beyond the bottom of the armature carrying the conducting transmission line. Closure of an armature causes the dimples of the corresponding conducting transmission line to mechanically and electrically engage the RF input line and the corresponding RF output line, thus directing RF energy from the RF input line to the selected RF output line.

20 Claims, 5 Drawing Sheets



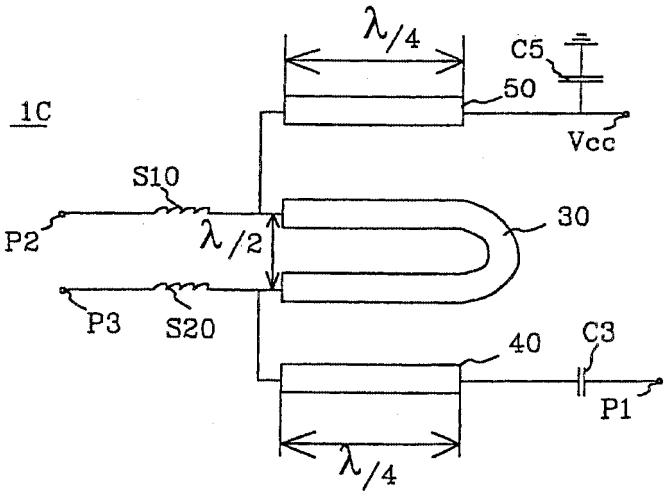
6,441,696 Aug. 27, 2002

BALUN

Inventor: David Westberg.
Assignee: Telefonaktiebolaget L M Ericsson
Filed: Jul. 7, 2000.

***Abstract*—**The present invention relates to a balun circuit that includes means for transforming a balanced input signal to an unbalanced signal and impedance changing means. The means for transforming the balun input signal to an unbalanced output signal is a $\lambda/2$-waveguide (**30**). A first side of the $\lambda/2$-waveguide (**30**) is connected to a second port (**P2**) of the balun circuit, while a second side of said $\lambda/2$-waveguide (**30**) is connected to a third port (**P3**) of the balun circuit. The impedance changing means is a $\lambda/4$-waveguide (**40**) of which a first side is connected to a second side of the $\lambda/2$-waveguide (**30**) and a second side is connected to the first port (**P1**) of the balun circuit.

5 Claims, 2 Drawing Sheets



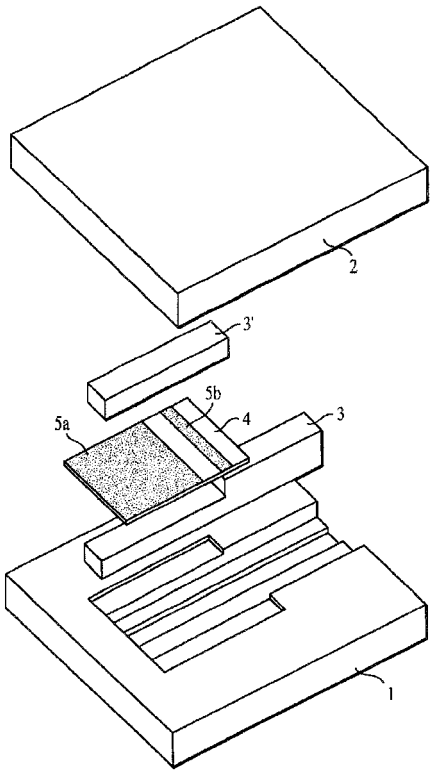
6,441,698 Aug. 27, 2002

DIELECTRIC-WAVEGUIDE ATTENUATOR, DIELECTRIC-WAVEGUIDE TERMINATOR, AND WIRELESS APPARATUS INCORPORATING SAME

Inventors: Kel Matsutani and Hiromu Tokudera.
Assignee: Murata Manufacturing Co. Ltd.
Filed: Jun. 27, 2000.

***Abstract*—**A dielectric-waveguide attenuator, a dielectric-waveguide terminator, and a wireless apparatus incorporating the same in which the length of a dielectric waveguide is shortened in a direction in which an electromagnetic wave propagates to reduce the size of the overall module. The two parts of a split dielectric strip are placed between an upper conductive plate and a lower conductive plate to form the dielectric waveguide, and a substrate having at least two resistance-film patterns formed thereon is positioned between the two dielectric strips. With this arrangement, the resistance films both attenuate signals and also discontinuously change line impedance at a plurality of places and synthesize the electromagnetic waves reflected at the parts where the line impedance discontinuously changes so that the reflected waves cancel each other.

15 Claims, 6 Drawing Sheets



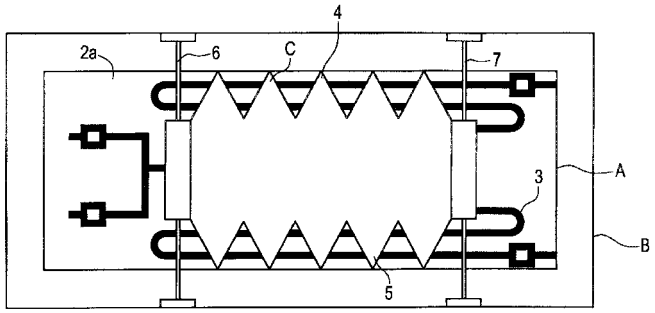
6,441,700 Aug. 27, 2002

PHASE SHIFTER ARRANGEMENT HAVING RELATIVELY MOVABLE MEMBER WITH PROJECTIONS

Inventor: Gang Xu.
Assignee: Alcatel
Filed: Mar. 18, 1999.

***Abstract*—**This invention discloses an adjustable, relatively small phase-shiftable network for an antenna array, which can be incorporated into a PCB distribution network. The network comprises a PCB distribution element (A) comprising a planar dielectric circuit board (**2**) supporting a pattern of conductive tracks (**3**). The conductive tracks and the dielectric circuit board form a transmission line network which splits a signal applied to a signal input terminal (I) into three paths that terminate respectively in three terminals (d_1, T′, B′ and C′) for feeding the input signal to Top (T′), Bottom (B′) and Center (C′) sections of a antenna array. The distribution element (A) is supported in a spaced relationship with a conductive ground plane (B). A moveable planar dielectric element (C) having a series of teeth (**4**, **5**) along opposite edges, is slidably mounted over the top surface of the distribution element (A). The moveable dielectric element (C) is supported in a slidable manner by two rods (**6**, **7**) attached to the ground plane (B). By moving the dielectric element, the phases in the top and bottom sections of the antenna array are changed in opposite directions so that the phase shift in one section is increased and the other section is decreased, which causes the radiating beam to tilt.

13 Claims, 9 Drawing Sheets



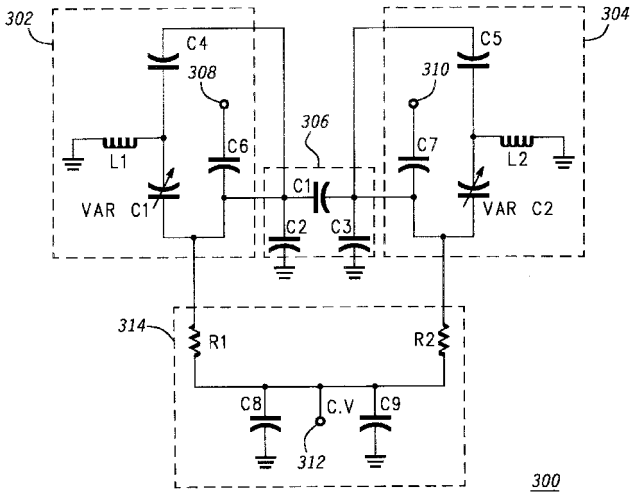
6,441,701 Aug. 27, 2002

TUNABLE BRIDGED-T FILTER

Inventor: Gilberto J. Hernandez.
Assignee: Motorola, Inc.
Filed: Sep. 22, 1999.

***Abstract*—**A tunable filter (**300**) includes first (**302**) and second (**304**) "bridged-T" resonators. The first (**302**) and second (**304**) resonators are capacitively coupled together via bandwidth control/coupling section (**306**). A biasing section (**314**) provides the proper biasing and decoupling for the filter (**300**). Filter (**300**) provides for low-side injection mode operation, and provides for a very deep zero on the lower side of the passband resulting in excellent selectivity. Filter (**300**) provides for excellent selectivity while reducing the number of inductors and varactors needed in the filter circuit. A high side injection mode filter (**500**) similar to filter (**300**) is also described in the disclosure.

8 Claims, 7 Drawing Sheets



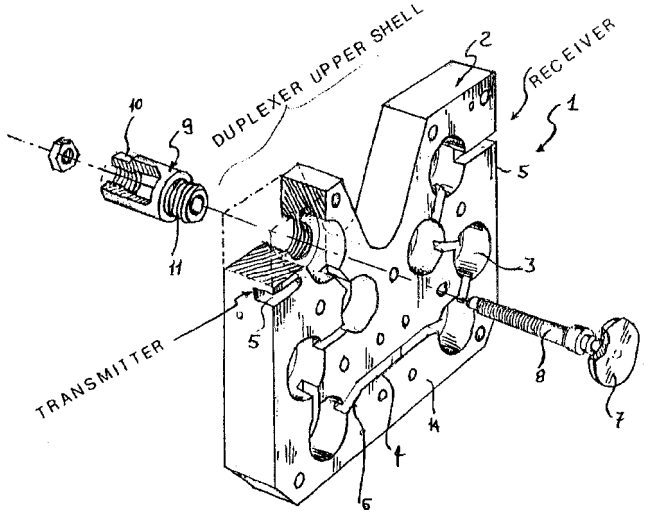
6,441,705 Aug. 27, 2002

TEMPERATURE SELF-COMPENSATING DECOUPLING FILTER FOR HIGH FREQUENCY TRANSCEIVERS

Inventors: Mario Costa and Roberto Ravanelli.
Assignee: Siemens Information and Communication Networks S.p.A.
Filed: Nov. 19, 1999.

***Abstract*—**The present invention relates to a duplexer set up by two decoupling filters for high frequency transceivers of the temperature self-compensating type and implemented by means of a pair of mechanic bodies (**2**), each one of which including a plurality of resonance cavities (**3**). Inside of the cavity (**3**) of the superior body (**2**) of the duplexer, a corresponding adjustment disc (**7**) is lodged in a removable and coaxial way which is provided with a supporting stem (**8**) coming out of a passage hole (**12**) obtained on the summit of the cavity (**3**). The bodies (**2**) are bound between them, so that the cavities of one or the other turn out to be coaxially facing each other. The passage hole (**12**) of the filter according to the invention is threaded. Moreover at each filter at least one bush (**9**) is associated having one portion (**11**) engaged in the hole (**12**) and inside of which the stem (**8**) of the disc (**7**) is housed.

5 Claims, 3 Drawing Sheets



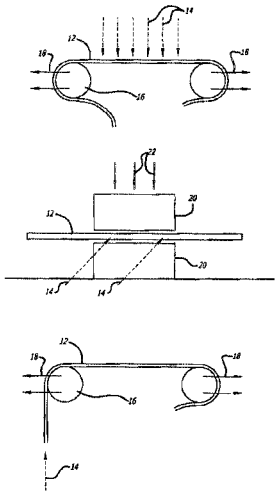
6,442,305 Aug. 27, 2002

METHOD FOR ALTERING THE REFRACTIVE INDEX OF OPTICAL FIBERS USING STRESS

Inventors: Dmitry Starodubov and Ertan Salik.
Assignee: Sabeus Photonics, Inc.
Filed: Dec. 21, 1999.

***Abstract*—**An optical fiber is stressed along its axis with a strain of at least 1% while light is introduced transversely to write a grating. The strain increases the photosensitivity of the fiber and reduces the time required to write the grating. Alternatively, the fiber can be compressed radially and inwardly, or compressed along its axis.

46 Claims, 3 Drawing Sheets



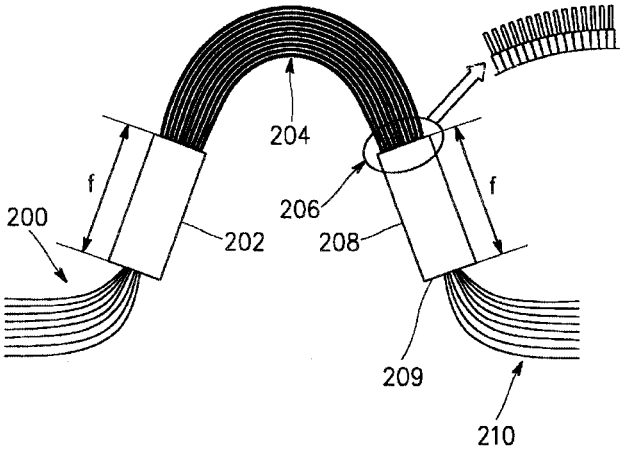
6,442,308 Aug. 27, 2002

OPTICAL WAVELENGTH MULTIPLEXER/DEMULTIPLEXER WITH UNIFORM LOSS

Inventors: Dong-Kyoon Han and Hyoun-Soo Kim.
Filed: Oct. 4, 1999.

***Abstract*—**Disclosed is an optical wavelength multiplexer/demultiplexer with uniform loss. The optical wavelength multiplexer/demultiplexer includes a first star coupler for dividing optical power of input optical signals received from input optical waveguides, an arrayed waveguide grating for guiding the optical signals outputted from the first star coupler therethrough in such a fashion that the optical signals have different phases, respectively, a second star coupler for coupling or dividing the wavelengths of the optical signals outputted from the arrayed waveguide grating, and outputting the resultant optical signals to output waveguides, respectively, and a waveguide mode controller for controlling the profile of a waveguide mode of the optical signals outputted from the arrayed waveguide grating, thereby allowing the optical signals focused at an output terminal of the second star coupler to have flat amplitude distributions. The waveguide mode controller maintains the main peak of the output waveguide mode while phase-shifting tails of the output waveguide mode. By virtue of the mode controller, it is possible to form a diffraction pattern with flat amplitude distribution. Accordingly, an uniformity of loss among channels is obtained.

4 Claims, 6 Drawing Sheets



6,442,313 Aug. 27, 2002

OPTICAL FIBER GRATING AND MANUFACTURING METHOD THEREOF

Inventors: Ryozo Yamauchi, Akira Wada, Tetsuya Sakai, Nobuyuki Tanaka, Kensuke Shima, Kenji Nishide, and Shigefumi Yamasaki.
Assignee: Fujikura Ltd.
Filed: Feb. 5, 2001.

***Abstract*—**An optical fiber grating is manufactured by heating intermittently an optical fiber, provided with a core having residual stress in the longitudinal direction, softening a peripheral cladding of the core, and forming spatial periodical changes for the relative refractive index-difference between the core and the cladding, in the longitudinal direction of the aforementioned optical fiber by having the index of refraction of the core change, through the releasing of the aforementioned residual stress. As a result, an optical fiber grating and the manufacturing method thereof, which do not require expensive equipment and which exhibit high productivity, and furthermore a grating characteristic which is stable over time can be provided.

6 Claims, 9 Drawing Sheets